

## **REMARKS**

The above amendments are submitted within the three-month period for response to the Final Office Action mailed September 20, 2006 and in connection with a Request for Continued Examination (RCE). Authorization to charge the \$790.00 requisite fee is hereby included in the Electronic Fee Sheet attached. Reconsideration and allowance of all pending claims are respectfully requested.

In the subject Office Action, claims 1, 11 and 16 were rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Application Publication No. 2004/0210563 to Zait et al. In addition, claims 2-4, 9-10, 12-15 and 17-23 were rejected under 35 U.S.C. §103(a) as being unpatentable over Zait et al. and further in view of U.S. Patent No. 5,345,585 to Iyer et al.; claim 5 was rejected under 35 U.S.C. §103(a) as being unpatentable over Zait et al. in view of Applicant Admitted Prior Art (AAPA); and claims 6-8 were rejected under 35 U.S.C. §103(a) as being unpatentable over Zait et al. and AAPA and further in view of Iyer et al.

Applicants respectfully traverse the Examiner's rejections to the extent that they are maintained. Applicants have canceled claims 2 and 17 and amended claims 1, 3, 12, 16, 18 and 21. Applicants respectfully submit that no new matter is being added by the above amendments, as the amendments are fully supported in the specification, drawings and claims as originally filed.

As an initial matter, Applicants wish to thank the Examiner for the consideration extended in the personal interview conducted between the Examiner and Applicants' representative on October 18, 2006. In the interview, the Examiner's objections to the 1.131 Affidavits and proposed amendments to the claims were discussed, as well as the Examiners' bases for rejection on several of the dependent claims. The Examiner did indicate that the addition of language to the claims directed to generating first and second portions of a result set for the same query before and after changing the join order would overcome the current rejections, but that a further search would be required before allowing the application.

Now turning to the subject Office Action, and specifically to the rejection of independent claim 1, this claim generally recites a method for monitoring a query during

runtime, said query involving a plurality of join operations. The method as amended includes running the query according to a first join order, generating a first portion of a result set for the query while running the query according to the first join order, concurrent with running the query, collecting performance statistics about each of the join operations, changing the first join order, during running of the query, to a second join order based on the statistics, and generating a second portion of the result set for the query while running the query according to the second join order.

The amendment incorporates the subject matter of claim 2, which was rejected as being obvious in view of Zait and Iyer. The amendment also clarifies that first and second portions of a result set for the same query are generated before and after changing the join order. The Examiner will note that claim 2 has been canceled, and claim 3 amended to depend from claim 1, for consistency with the amendments made to claim 1.

As noted in the aforementioned interview, Zait collects statistics during the execution of a query, but the collected statistics are only used to optimize the performance of later queries. Paragraphs [0034]-[0036] disclose optimizing a query statement, but it is clear from that passage that the optimization will only apply to further executions of that statement, rather than the execution during which the statistics are collected. The Examiner should note that Figs. 7 and 8 of Zait, as well as paragraphs [0034]-[0036] which discuss these figures, refer to improving the performance of a query statement, or generating a new execution plan or selecting another execution plan. There is no disclosure or suggestion in these passages, however, that the updates to the execution plan used by a query statement are used in the same execution of the query statement during which statistics are collected. Indeed, block 710 of Fig. 7, which refers to improving the performance of the query statement, is performed just before the end of the flowchart, and does not refer to continuing to run the query. Of note, Zait still provides a performance benefit in that the next time the same query is run, the improved performance will be realized. However, Zait does nothing to address any sub-optimal performance of a query that is currently being executed.

Claim 1 has been amended to clarify that first and second portions of the same result set, for the same execution of a query, are generated before and after a dynamic

change in join order. As such, it is evident that the claim addresses the situation where the execution of a query is started and a portion of a result set is generated for that query, and then, during the execution of that query, statistics are collected and the join order is dynamically changed based upon the collected statistics. During the same execution of the query, and after the change to the join order, a second portion of the result set is collected. Zait, which only discloses changing an execution plan based upon statistics collected during one execution of a query, such that a subsequent execution of the same query runs according to the modified execution plan, does not disclose or suggest this concept.

Iyer adds little to the rejection. Iyer discloses optimizing join order based upon a cost estimate, but does not base the cost estimate on statistics collected during the same execution of the query. The passages at col. 7 and 8, cited by the Examiner in the rejection of claim 2, merely disclose the selection of a join order during the generation of an execution plan for a query. This operation, however, is performed during the initial generation of the execution plan, and before the actual execution of a query using the execution plan. As such, the reference does not disclose either collecting statistics during execution of a query, or dynamically changing a join order during the execution of a query such that first and second portions of a result set are generated using different join orders. Accordingly, one of ordinary skill in the art would not look to Iyer for the motivation to modify Zait to incorporate a dynamic change in join order, as would be required to establish a *prima facie* case of obviousness as to claim 1.

In short, neither Zait nor Iyer appreciates that join order may be selected dynamically during execution of a query based upon statistics collected during the same execution of that query, and that different portions of the same result set can be generated during the execution of a query using different join orders. Claim 1 is therefore non-obvious over Zait and Iyer.

The Examiner does attempt to rebut Applicants arguments at page 24 of the Office Action. In doing so, the Examiner argues that Zait discloses generating a second execution plan in paragraph [0035]. However, as discussed above, this passage does not disclose that the second execution plan is used to continue the processing of the same

execution of a query. The Examiner also argues that element 806 of Fig. 8 starts a later query, and that there is no loop back, so the query is not fully executed until a fully optimized execution plan is selected. However, element 806 is a statement, e.g., a SQL statement, for which optimizer 804 generates an execution plan that is executed by executor 812. Zait is illustrating in Fig. 8 that the next time the same statement 806 is received from a client, a different execution plan may be selected by the optimizer and executed by the executor. The figure, however, does not disclose or suggest that any change may occur in the execution plan used by executor 812 during one execution of the query statement. The figure also does not disclose or suggest that different portions of the same result set for a query can be generated using different execution plans.

Applicants therefore respectfully submit that claim 1 is non-obvious over Zait and Iyer. Reconsideration and allowance of claim 1, and of claims 2-11 which depend therefrom, are respectfully requested.

Next, turning to independent claim 12, this claim generally recites a method for optimizing a query join order during runtime, said query involving a plurality of join operations. The method includes running the query according to a first join order, concurrent with running the query, collecting statistics about each of the join operations, and based on the collected statistics, selecting a preferred join order, while running the query, such that the query continues to run according to the preferred join order.

The Examiner will also note that claim 12 has been amended to additionally recite, similar to claim 1, the additional steps of generating a first portion of a result set for the query while running the query according to the first join order, and generating a second portion of a result set for the query while running the query according to the preferred join order.

As discussed above in connection with claim 1, the combination of Zait and Iyer fails to disclose or suggest the collection of statistics during the execution of a query and dynamically changing a join order during execution of that same query based upon the collected statistics, where first and second portions of a result set for the same query are generated before and after the change in join order. Accordingly, Applicants submit that claim 12 as amended is patentable over Zait and Iyer for the same reasons as presented

above for claim 1. Reconsideration and allowance of claim 12, and of claims 13-15 which depend therefrom, are therefore respectfully requested.

Next, with respect to independent claims 16 and 21, each of these claims has been amended in a similar manner to claim 12. Claim 17 has also been canceled, and claim 18 has been amended to depend from claim 16 (along with correcting a typographical error), for consistency with the amendments made to claim 16. As such, claims 16 and 21 as amended are patentable over Zait and Iyer for the same reasons as presented above for claims 1 and 12. Reconsideration and allowance of claims 16 and 21, and of claims 17-20 and 22-23 which depend therefrom, are therefore respectfully requested.

Finally, Applicants traverse the Examiner's rejections of the dependent claims based upon their dependency on the aforementioned independent claims. Nonetheless, Applicants do note that a number of these claims recite additional features that further distinguish these claims from the references cited by the Examiner. However, in the interest of prosecutorial economy, these claims will not be addressed separately herein.

In summary, Applicants respectfully submit that all pending claims are novel and non-obvious over the prior art of record. Reconsideration and allowance of all pending claims are therefore respectfully requested. If the Examiner has any questions regarding the foregoing, or which might otherwise further this case onto allowance, the Examiner may contact the undersigned at (513) 241-2324. Moreover, if any other charges or credits are necessary to complete this communication, please apply them to Deposit Account 23-3000.

Respectfully submitted,

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Date

/Scott A. Stinebruner/

Scott A. Stinebruner  
Reg. No. 38,323  
WOOD, HERRON & EVANS, L.L.P.  
2700 Carew Tower  
441 Vine Street  
Cincinnati, Ohio 45202  
Telephone: (513) 241-2324  
Facsimile: (513) 241-6234